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No significant change in sexual behavior in association with human papilloma virus vaccination in young girls

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Abstract

The first human Papilloma virus (HPV) vaccine was approved in the United States in 2006 with the potential to reduce cervical cancer and genital warts. Since then, its efficacy in preventing HPV-related cancers in both males and females has been promising. Despite CDC recommendations, opponents of the vaccine assert that vaccinating pre-adolescents and adolescents will increase their sexual activity, as well as overtly condone risky sexual behavior. We analyzed clinic data of 499 adolescents with a mean age of 16 years to explore whether vaccination led to change in sexual behavior after one year. Our results showed no statistically significant difference in either initiation of sexual activity or change in sexual behavior when compared to peers, therefore refuting the assertion that this method of preventative healthcare promotes promiscuity. Thus, we conclude that teenage sexual behavior is linked more closely to ethics, morality, and other socio-cultural phenomena rather than HPV vaccine itself.

Keywords: Human papilloma virus, vaccination, adolescents, sexual behavior.

Introduction

The human papillomavirus (HPV) is the most common sexually transmitted infection in the United States (1). The virus specifically targets the stratified epithelium of skin and mucous membranes. The infection can result in a spectrum of conditions including skin and anogenital warts, various anogenital malignancies, and in some cases with nongenital manifestations. While there are more than one hundred subtypes of the virus, the most common include the low risk subtypes, 6 and 11, and the higher risk subtypes, 16 and 18. It is estimated that these four subtypes alone result in more than 90% of the cases of genital warts, and about 70% of the cases of cervical cancer (2-4).

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In 2006, the first vaccine against HPV was approved by the Food and Drug Administration (FDA) for use in females aged 9 to 26 years old in a tetravalent form targeting subtypes 6, 11, 16 and 18 (5). A bivalent version targeting types 16 and 18 was later approved in 2009 for prevention of cervical cancer and other precancerous lesions, also in females (6). As these vaccines were made available, the CDC's advisory committee on immunization practices (ACIP) concomitantly recommended routine vaccination of females 11-12 years old, or catch up vaccination in females aged 13-26 irrespective of previous sexual activity, as well as in male aged 9-26 (7,8), ultimately sparking a great debate across the world. Given that the last time the vaccine-cancer link was realized in the 1980s with the hepatitis B vaccine and hepatocellular cancer, the HPV vaccine was viewed with great promise.

The efficacy of the vaccine itself in prevention of an array of cancers, including cervical, penile, vulvar, vaginal, and anal cancer, and precancerous lesions (9-11) would at first glance seem to outweigh any possible disadvantages. Early studies looking at the acceptability of the vaccine demonstrated that most parents were in favor of vaccinating their daughters after certain criteria were achieved including: whether the parent understood its effectiveness, whether the vaccine was recommended by a physician, and whether HPV infection was probable. Initial roadblocks cited included cost, and concerns that vaccination promoted earlier sexual activity in young girls (12). Looking at the last five years, very little has changed in either of these obstacles. The price of vaccination has remained high for those with no insurance and over 18 years of age, totaling about $360 for the series of three vaccinations, while the cost of other childhood vaccinations that protect against multiple diseases are all less than $50. Likewise, parents opposing vaccination remain vigilant that early vaccination will both increase their child's sexual activity, and condone risky sexual behavior (13). Since CDC recommendations for this particular vaccine are for an older age group than other childhood vaccinations, parents worry about any possible questions their children may have. Accurately and responsibly fielding these questions is something parents most likely fear because of ideas it may ignite in young impressionable minds (14).

There were many preconceptions about the HPV vaccine even prior to its release in 2006. One study in the late 1990s surveyed adolescents about how they believed teenage behavior would change after receipt of the vaccine. Surprisingly, 77% believed there would be a substantial increase in risky sexual behavior (15). It is easy to ascertain that if adolescents have this misconception, that even greater numbers of parents would have similar notions about the vaccine.

Years after landmark trials demonstrated the link between HPV and cancer prevention, poor acceptance of the vaccine continued, alerting us to problems requiring further attention. One study reported findings from telephone surveys of parents of young girls in public schools aged 11-18 years in economically disadvantaged areas in Los Angeles, California between 2007-2008. More than two years after the vaccine release, parents echoed earlier sentiments that the vaccine may be harmful, costly, that their daughter wasn't old enough to receive protection against an STI, and that the vaccine may lead to sexual activity (16). Additionally, 75% of surveyed parents were familiar with the HPV vaccine. Of these, 75% were aware that their daughter was eligible for the vaccine, and that it would be most beneficial prior to the onset of sexual activity (16). This study clearly demonstrates that even though the public is educated about the ability and benefits of the vaccine, misconceptions about its side effects remain and need to be further addressed. Future generations would be better served if socio-cultural pressures did not affect the prevention of cancer.

In this study, we analyzed clinical data to investigate if the claims of change in sexual behavior following HPV vaccination were true.

Methods

All patients in our adolescent medicine clinic are screened for all risk behaviors, including sexual activity at their initial visit, then the risk behaviors are updated on each visit. Adolescent female patients attending our adolescent clinic who were also receiving the HPV vaccine were chosen as participants for our retrospective study. We analyzed the risk assessment forms for qualifying females at various time points including prior to vaccination,

upon completion of the vaccination series, and one year later. This method provides clinical data at different time points with reference to vaccination, allowing us to explore changes in sexual behavior. All adolescent girls who have received the vaccine were included in the study. Sexual activity data prior to the start of the vaccine series and at 1 year after completion of the series were analyzed.

However, such a method is not without limitations, assuming that all outcomes can be measured through these observed variables even if they are partially affected by socio-environmental sources. In other words, it neglects the social and environmental influences on the dynamics of teenage behavior. Regardless, it is still useful to explore the assertion that vaccination will lead to promiscuity since our observations on sexual behavior are in the same individuals. A simple comparison of sexual activity at these separate points in time can guide future research. We present the results of applying a non-parametric approach to comparing sexual behavior in the same individuals.

Results

There were 499 female adolescents who received the vaccine. At the time of the first vaccination, the average age of the sample was 16.05 (sd=2.9); 51.4% of the sample was not sexually active i.e. claiming to have zero partners; the average age of the sexually inactive group was 14.89 (sd=2.98); 12% of the total were smokers; 8% had abnormal PAP results; 6.8% had prior diagnosis of HPV. The variable 'number of partners' was used to investigate change in sexual behavior following vaccination.

Our first and most pressing question was whether there was a significant change in the sample's sexual behavior following the vaccination. Since data collected is from the same individuals at different points in time, a matched (related samples) non-parametric Wilcoxon signed rank test was carried out.

At time 1, the start of the vaccination series, 51.4% of the sample claimed to be sexually inactive by not having a partner. At the end of one year, 51.2% of the sample again claimed to be sexually inactive. Obviously, a change of 0.2% is insignificant and does not warrant statistical analysis. Additionally, one year after vaccination, 2.8% of sexually inactive became active by having at least one partner. Alternatively, 2.6% of sexually active became inactive after one year. Again, these are relatively minor changes and do not warrant statistical analysis.

On the other end of the spectrum is further analysis of the sexually active group. In the sample, 22.6% of claimed to have three or more partners at time 1. After one year, this decreases to 22.4%. Again, a change of 0.2% is very minor and does not warrant statistical analysis. Of those claiming to have more than three partners, one year later 4.5% were sexually inactive. Conversely, of those who had 3 or more partners after one year, 1.8% had none, 0.9% had one, and 0.9% had 2 partners at time 1. Again, these are insignificant changes that do not require further analysis.

Discussion

The premise of this study is to explore the assertion that preventative health care in the form of HPV vaccination in pre-adolescents will lead to promiscuity. Two significant issues stem from this assertion. First, we begin to question the nature of healthcare programs in the medical context, and also in terms of its morality and socio-cultural phenomena. Second, we begin to question adolescents' ability to make decisions. Both of these issues are extremely complex, governed by dynamics of human behavior (17,18) It is difficult to accurately quantify the effects of continuous exposure to sexual material associated with the HPV vaccine in each distinct adolescent who may or may not have had any previous exposure from the media, personal experiences, parents, or even sexual education courses. How could we assess the interaction between this continuous background exposure with health and social policies in adolescent care? And would this so called 'negative' publicity taint adolescents' decision making? In other words, an assertion that obviously associates a healthcare program with sexual activity may in fact be counterproductive and detrimental; by doing so, we increase exposure to sexual behavior, ignore the adolescents' process of decision making, and most importantly, make unsubstantiated assertions.

We quantify sexual activity of adolescents through the variable 'number of partners,' to explore adolescent sexual behavior. However, this clinical dataset is still limiting. The dataset used in this paper only provides number of partners as reported by the participants at the time of each visit. There is no objective way to verify this information. Nevertheless, analysis of our dataset still yields the important conclusion that essentially sexually non-active adolescents remain sexually inactive after vaccinations. Furthermore, there is also some indications that change in behavior may be in both directions; a small proportion of those who had no partners at time one appear to have at least one partner one year later which is still less than would be expected by age change, and, conversely, a small proportion of those with at least one partner at time one appear not to have a partner a year later. If these results accurately reflect adolescent behavior in the general population, we presume that vaccination and sexual behavior are unrelated. Moreover, we speculate that at least in the short term, the real issue at hand is the social and cultural factors.

Based on the results of this study, vaccinating young girls with the HPV vaccine does not alter their sexual behavior in a significant manner. Considering the health benefits of the vaccine, fear of a potential change in sexual behavior which does not seem to actually exist, should not get in the way of providing the protection against serious illnesses that the vaccine provides.

References

[1] Cates W Jr. Estimates of the incidence and prevalence of sexually transmitted diseases in the United States. American Social Health Association Panel. Sex Transm Dis 1999;26(4 Suppl):S2-7.

[2] Bosch FX, de Sanjose S. Human papillomavirus and cervical cancer: burden and assessment causality. J Natl Cancer Inst Monogr 2003;31:3-13

[3] Brown DR, Schroeder JM, Bryan JT, Stoer MH, Fife KH. Detection of multiple human papillomavirus types in Condylomata acuminata lesions from otherwise healthy and immunosupressed patients. J Clin Microbiol 1999;37(10):3316-22

[4] Greer CE, Wheeler CM, Ladner, MB, et al. Human papillomavirus (HPV) type distribution and serologic response to HPV type 6 virus-like particles in patients with genital warts. J Clin Microl 1995;33(8):2058-63.

[5] US Food and Drug Administration. Product approval information: licensing action, Gardasil. Accessed 2011 Jan 3, 2011. URL: http://www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm111283.htm

[6] US Food and Drug Administration. Product approval information: licensing action, Cervarix. Accessed 2011 Jan 3, 2011. URL: http://www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm186959.htm

[7] CDC. FDA licensure of bivalent human papillomavirus vaccine (HPV2, Cervarix) for use in females and updated HPV vaccination recommendations from the Advisory Committee on Immunization Practices (ACIP) and FDA licensure of quadrivalent human papillomavirus vaccine (HPV4, Gardasil) for use in males and guidance from the Advisory Committee on Immunization Practices (ACIP). MMWR 2010;59:626-32.

[8] CDC. FDA Licensure of Bivalent Human Papillomavirus Vaccine (HPV2, Cervarix) for Use in Females and Updated HPV Vaccination Recommendations from the Advisory Committee on Immunization Practices (ACIP). MMWR 2010;59(20):626-9.

[9] Villa LL, RLR Costa, CA Petta, et al. Prophylactic quadrivalent human papillomavirus (types 6,11,16, and 18) L1 virus-like particle vaccine in young women: a randomised double-blind placebo-controlled multicentre phase II efficacy trial. Lancet Oncol 2005;6(5):271-8.

[10] Harper D, Franco E, Wheeler C et al. Efficacy of a bivalent L1 virus-like particle vaccine in prevention of infection with human papillomavirus types 16 and 18 in young women: a randomised controlled trial. Lancet 2009;364 (9447):1757-65

[11] Garland SM, Hernandez-Avila M, Wheller CM, et al. Quadrivalent Vaccine against Human Papillomavirus to Prevent Anogenital Diseases. New Engl J Med 2007;356:1928-43.

[12] Brewer NT, Fazeskas KI. Predictors of HPV vaccine acceptability: a theory-informed, systematic review. Prev Med 2007;45(2-3):107-14.

[13] Olshen E, Woods ER, Austin SB, et al. Parental Acceptance of the human papillomavirus vaccine. J Adolesc Health 2005;37:242-51.

[14] Zimet GD. Improving adolescent health: Focus on HPV vaccine acceptance. J Adolesc Health 2005;37:S17-S23.

[15] Webb PM, Zimet GD, Fortenberry JD, et al. HIV immunization: acceptability and anticipated effects on sexual behavior among adolescents. J Adolesc Health 1999;25:320–2.

[16] Guerry SL, De Rosa CJ, Markowitz LE et al. Human papillomavirus vaccine initiation among adolescent girls

in high-risk communities. Vaccine 2011;29(12).2235-41.

[17] Zimet GD, Mays RM, Forteaberry JD. Vaccines against sexually transmitted infections: promise and problems of the magic bullets for prevention and control. Sex Transm Dis 2000;27:49-52.

[18] Shahtahmasebi S. Teenage smoking: Researching behaviour. Int J Psychol Res 2007;17(2):93-122.

[19] Shahtahmasebi S, Berridge D. Teenage drinking patterns: A longitudinal analysis. Int J Adolesc Med Health 2009;21(3):371-85.

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